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What is claimed is:

1. A high fill factor image array comprising,

a plurality of source-drain metal contacts disposed in an image array pattern,

a dual dielectric passivation layer that suppresses lateral leakage current comprising a first passivation layer and a second passivation layer deposited over the first passivation layer, wherein the thickness of the second passivation layer is less than the thickness of the first passivation layer,

a plurality of a patterned collection electrodes disposed on top of the source-drain metal contacts,

a first doped silicon layer disposed over the collection electrodes,

a continuous layer of a-Si,

a continuous second doped silicon layer, and,

an upper electrode.

15 2. The high fill factor image array of claim 1, wherein the first doped silicon layer is N+ doped a-Si.

3. The high fill factor image array of claim 1, wherein the first passivation layer is silicon oxynitride, BCB, or a polyimide.

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- 5. The high ful factor image array of claim 1, wherein the continuous second doped silicon dever is P+ doped a-Si.
- 5 6. The high fill factor image array of claim 4, wherein the second passivation layer has a thickness of about 1000 Å.
 - 7. A method for making a high fill factor image array comprising the steps:

providing a plurality of source-drain metal contacts;

depositing a first passivation layer;

depositing a second passivation layer that suppresses lateral leakage current;

opening a plurality of via holes through the first and second passivation layers;

depositing a layer of conductive material;

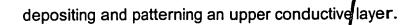
depositing a first doped a Si layer;

patterning to form the collection electrodes;

depositing a continuous layer of i a-Si;

depositing a continuous second layer of doped a-Si;

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- 8. The method for making a high fill factor image array according to claim 7, wherein the first passivation layer comprises silicon oxynitride, BCB, or a polyamide.
- 5 9. The method for making a high fill factor image array according to claim 7, wherein the second passivation/layer is an oxide.
 - 10. The method for making a high fill factor image array according to claim 7, wherein the second has a thickness of about 1000 Å.

